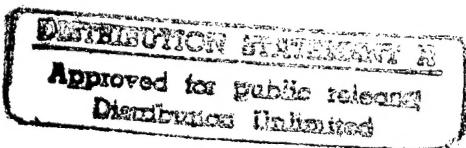


INSTALLATION RESTORATION PROGRAM  
FURTHER ACTION  
DECISION DOCUMENT  
FOR SITE 3  
FINAL



MICHIGAN AIR NATIONAL GUARD  
110th FIGHTER GROUP  
BATTLE CREEK, MICHIGAN

October 1997



Air National Guard  
Andrews AFB, Maryland

19971203 167

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## APPENDICES

Appendix A      Letter from the Michigan Department of Environmental Quality

## ACRONYM LIST

ANGRC	Air National Guard Readiness Center
ARARs	Applicable or Relevant and Appropriate Requirements
COCs	chemicals of concern
DOD	Department of Defense
FS	Feasibility Study
GSI	Groundwater/Surface Water Interface
IRP	Installation Restoration Program
MDEQ	Michigan Department of Environmental Quality
MERA	Michigan Environmental Response Act
MIANG	Michigan Air National Guard
PA	Preliminary Assessment
PCE	tetrachloroethene
PP	Priority Pollutant
RAOs	remedial action objectives
RI	remedial investigation
SI	site investigation
SVOCs	semi-volatile organic compounds
SVE	soil vapor extraction
VOCs	volatile organic compounds

## **1.0 INTRODUCTION**

This decision document presents the rationale for the proposed remedial action alternative for the Michigan Air National Guard's (MIANG's) W.K. Kellogg Memorial Airport Site 3, in Battle Creek, Michigan. The draft final decision document was reviewed by the Michigan Department of Environmental Quality (MDEQ) and the MDEQ September 4, 1997 letter agreeing with the proposed action is provided in Appendix A. This document is part of the U.S. Department of Defense's (DOD's) Installation Restoration Program (IRP).

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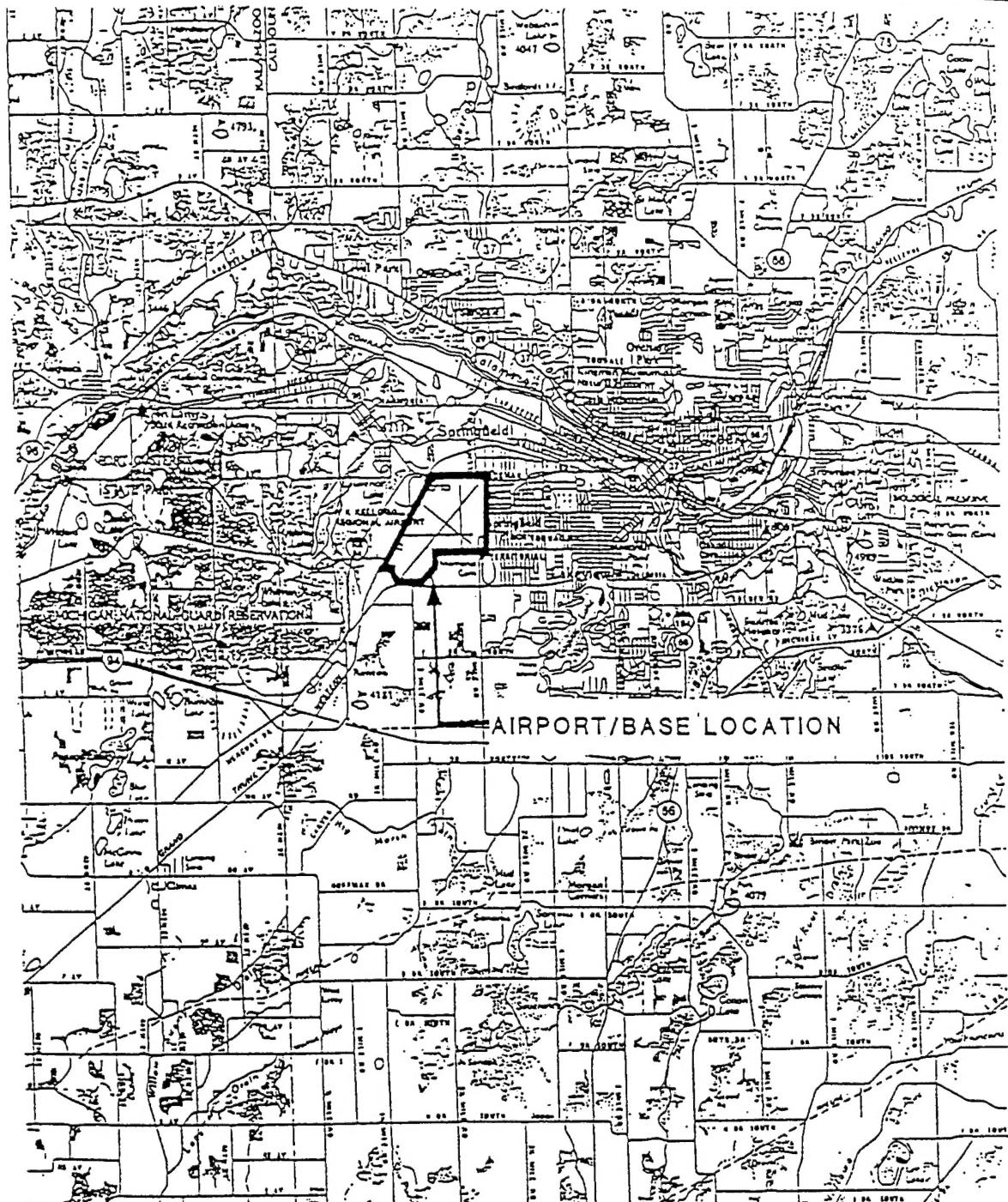
## 2.0 BASE/SITE DESCRIPTION AND HISTORY

The MIANG base is located in south-central Michigan at the W. K. Kellogg Memorial Airport in Battle Creek, Michigan (Figure 1). The base occupies 315 acres in the northwestern portion of the airport. The Grand Trunk Western Railroad divides the base into two sections; the western portion is approximately 204 acres and the eastern portion is approximately 111 acres.

Prior to 1924, the property on which the base is located was used for agricultural purposes. In September 1924, a lease with an option to buy was signed by the Battle Creek Chamber of Commerce. Four years later, W.K. Kellogg donated the necessary money to purchase and make improvements to the site for use as an airport. The Army Air Corps used the airport for combat duty training and to stage crews for overseas deployment from 1942 to 1946. During this time, new runways were constructed and existing runways were lengthened. Buildings were also erected to house base personnel and to support military functions.

In 1946 the Army Air Corps ceased using the airport, the 172nd Fighter Squadron of the MIANG was formed, and Kellogg Field was designated as its headquarters. In 1951, the unit was called to active duty as part of the 56th Fighter Wing at Selfridge Air Force base in Michigan. The unit was redesignated as the 172nd Fighter Bomber Squadron when it returned to Kellogg the following year. In 1955, the unit was reorganized as the 172nd Fighter Interceptor Squadron and was upgraded to the 110th Fighter Group in 1956. This unit was deactivated and redesignated the 172nd Tactical Reconnaissance Squadron in 1958. In 1962, the 172nd Tactical Reconnaissance Squadron became the 110th Tactical Reconnaissance Group. This unit was replaced by the 110th Tactical Air Support Group in 1971. In 1986, the area that the base occupied was increased from approximately 90 acres to 315 acres. In 1992, the unit was reorganized as the 110th Fighter Group and assigned the A-10 aircraft which it currently operates. Throughout its history, the base has stored and used various types of potentially hazardous materials in support of its primary fighter mission.

Site 3 is located on the western part of the base, southwest of the Civil Engineering storage yard. The fire training area is approximately 85 feet in diameter and surrounded by an earthen berm. Fire training exercises were conducted at this site from approximately 1977 to 1986. During this time, approximately 54,000 to 74,000 gallons of a mixture consisting of waste JP-4, waste oils, waste hydraulic fluid, and spent cleaning solvents were reportedly burned during fire training exercises (Hazardous Materials Technical Center, 1987). The mixture of wastes was floated on top of water, ignited, and extinguished. An area where drums of waste were stored prior to use in fire training exercises is located north of the fire training area. A bioventing system, including blower and vent well, has previously been installed at this site. Features of Site 3 are shown in Figure 2.



MICHIGAN

NOTE

BASE MAP DEVELOPED FROM THE  
MICHIGAN ATLAS AND GAZETTEER  
PAGE 29, FOURTH EDITION  
SECOND PRINTING.

MICHIGAN AIR NATIONAL GUARD  
110th FIGHTER GROUP  
BATTLE CREEK, MICHIGAN

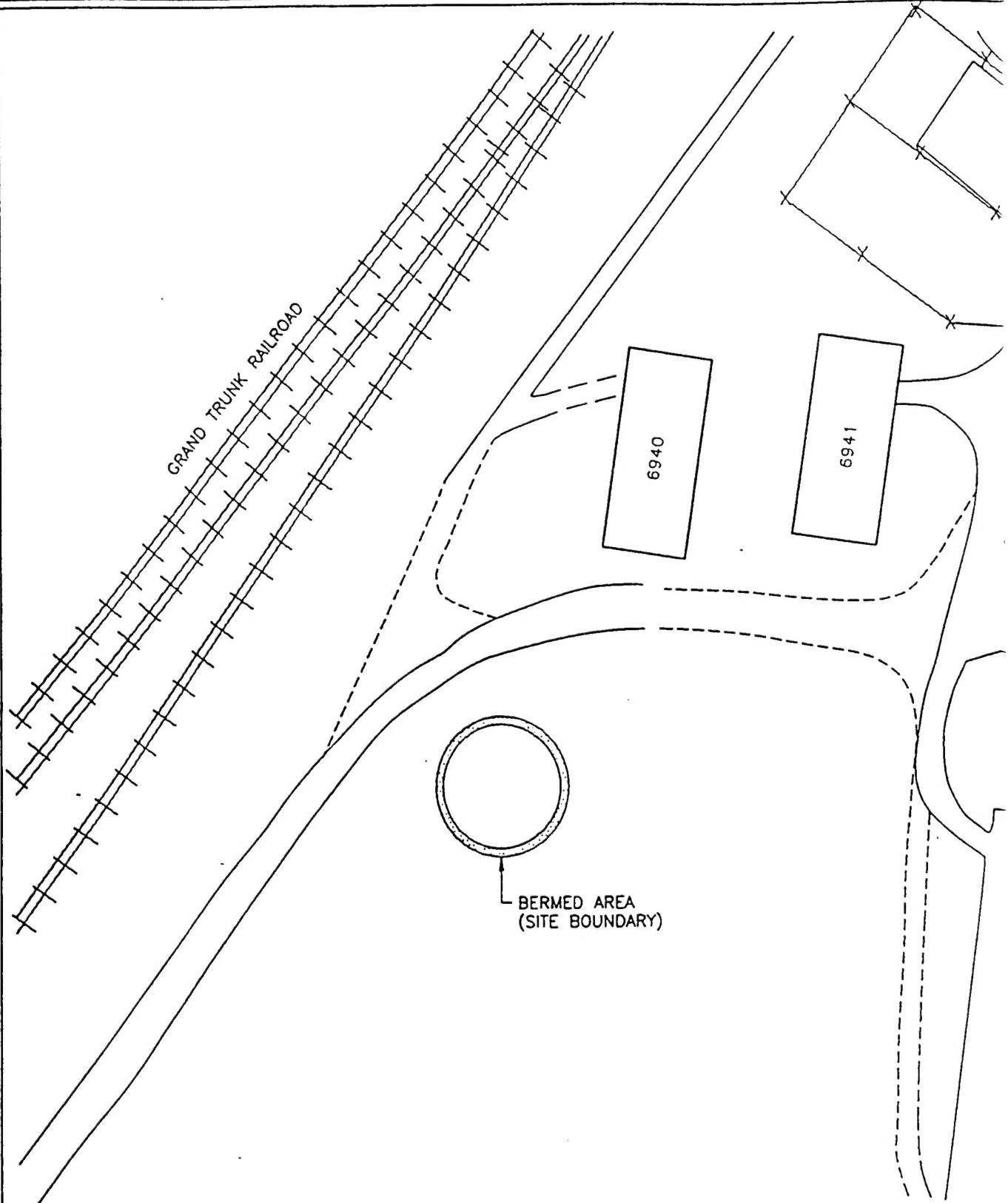
### GENERAL LOCATION MAP

## FIGURE 1



MONTGOMERY WATSON

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LEGEND



FENCE



RAILROAD

310

BUILDING WITH ID NUMBER

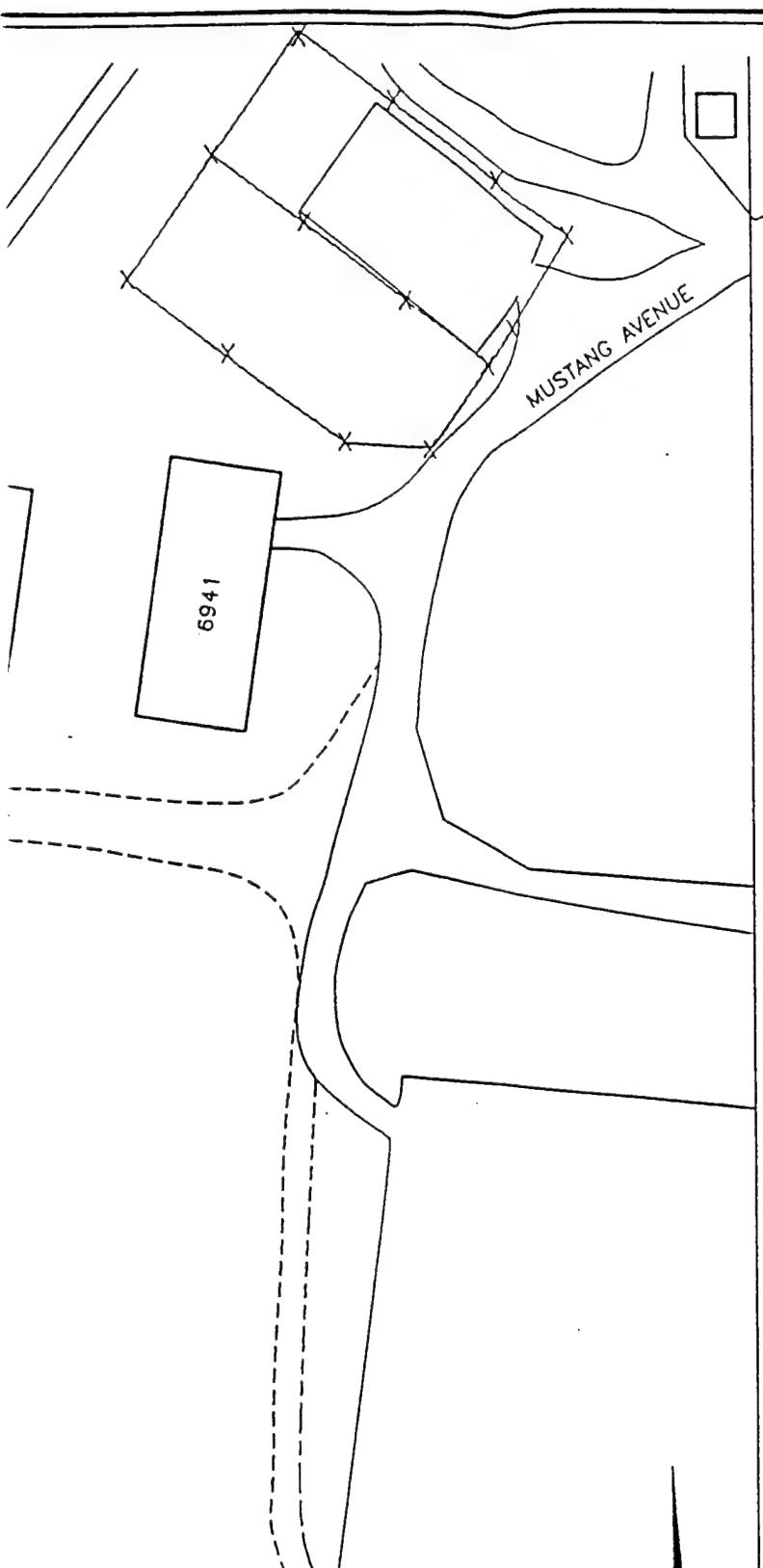


ROAD (DASHED WHERE DIRT)

0

80

SCALE IN FEET



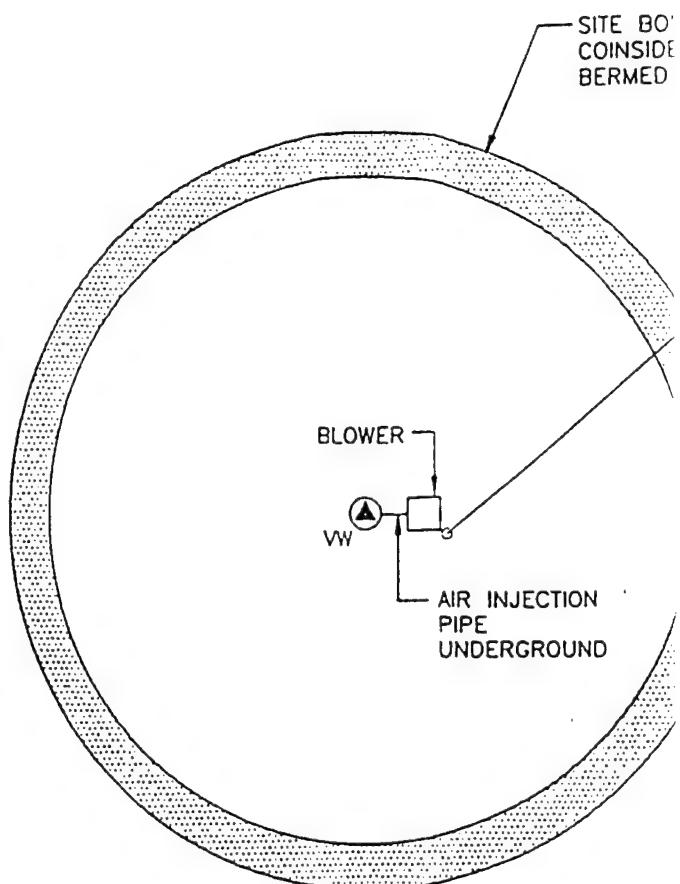
ROAD

MUSTANG AVENUE

6941

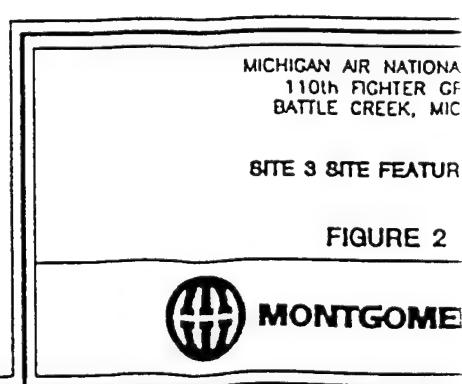
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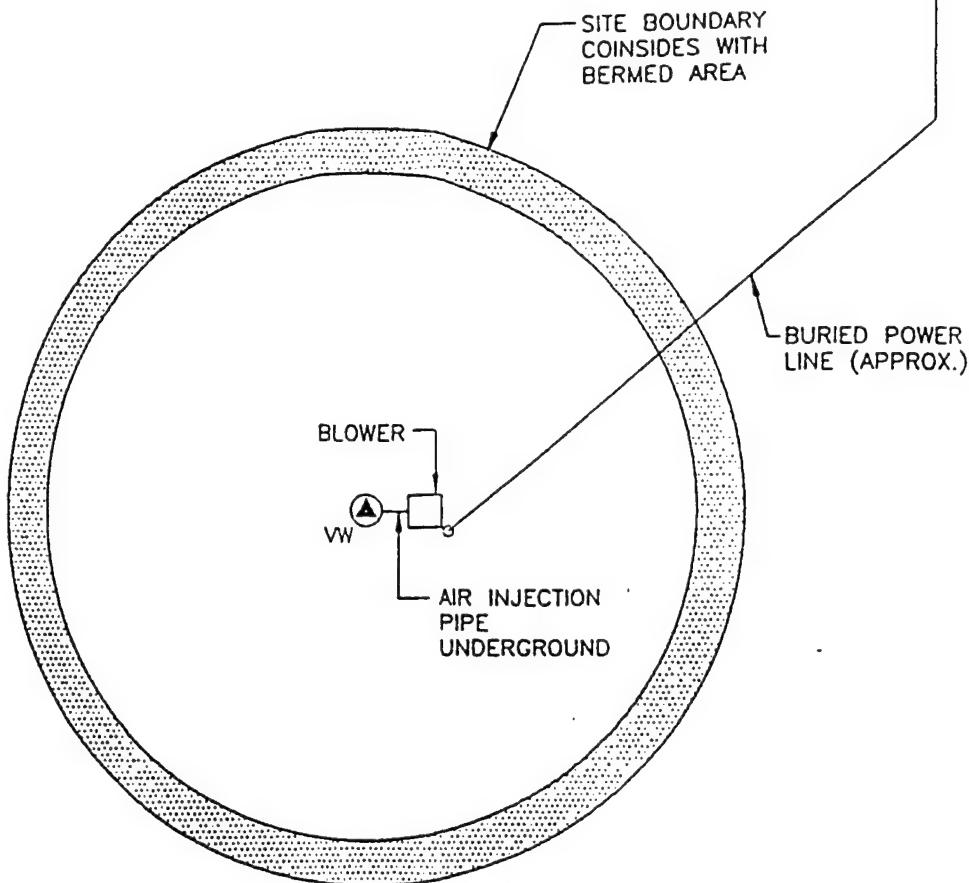
LEGEND  
VW (1992) CENTRAL VENT WELL

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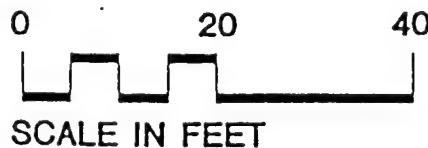
MONTGOME

ROAD



LEGEND

VW (▲) CENTRAL VENT WELL  
(1992)



MICHIGAN AIR NATIONAL GUARD  
110th FIGHTER GROUP  
BATTLE CREEK, MICHIGAN

SITE 3 SITE FEATURES MAP

FIGURE 2



MONTGOMERY WATSON

### **3.0 SUMMARY OF SITE ANALYSIS**

We conducted an IRP Phase I Preliminary Assessment (PA) at the base in 1987 to identify and assess past operations at the base that may have involved storage, disposal, or spills of hazardous materials or wastes (Hazardous Materials Technical Center, 1987). Site 3 was identified during the PA.

During the site investigation (SI) in 1988, we completed soil sampling at Site 3. In addition, we installed and sampled groundwater monitoring wells. Details of the SI activities including the depth of each sample, contamination concentrations, the depth of the contamination, and the methods used in collecting and analyzing the samples, are presented in the Final SI Report (Engineering-Science, 1993)

Based on SI sampling results, we selected the site for a year long bioventing pilot study which was initiated in 1992.

We completed subsequent remedial investigation (RI) activities in 1995. RI activities included collection of six surface and subsurface soil samples for analysis of Priority Pollutant (PP) metal plus barium, and collection of six groundwater samples from existing wells for analyses of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and PP metals plus barium. The RI Report (The Earth Technology Corporation, 1995) includes the details of the sampling, including the depth of each sample, contamination concentrations, the depth of the contamination, and the methods used in collecting and analyzing the samples.

The following sections are a discussion of the chemicals of concern (COCs) identified in the Feasibility Study (FS) for groundwater and soil at Site 3.

### **3.1 Groundwater**

Constituents in groundwater samples from Site 3 were compared with Applicable or Relevant and Appropriate Requirements (ARARs) to identify COCs. ARARs considered in the FS include:

- Generic Industrial Cleanup Criteria for health based drinking water value (Industrial Drinking Water Values) as outlined in the Michigan Environmental Response Act (MERA), Operational Memorandum #14, Revision 2, June 1995.
- Generic Industrial Groundwater/Surface Water Interface (GSI) as outlined in the MERA, Operational Memorandum #14, Revision 2, June 1995.

The following contaminants were identified as COCs and are considered for remedial actions:

- cis-1,2-dichloroethene at concentrations exceeding the Industrial Drinking Water Value;
- Benzene at concentrations exceeding the Industrial Drinking Water Value;
- Toluene at concentrations exceeding the Industrial Drinking Water Value; and
- Trimethylbenzenes at concentrations exceeding the Industrial Drinking Water Value.

### 3.2 Soil

Constituents in soil samples from Site 3 were compared with ARARs to identify COCs. The ARARs considered in the FS include:

- Generic Industrial Cleanup Criteria for soil direct contact (Industrial Direct Contact Values) as outlined in the MERA, Operational Memorandum #14, Revision 2, June 1995.
- Generic Industrial Cleanup Criteria for soil considered protective of groundwater as outlined in the MERA, Operational Memorandum #14, Revision 2, June 1995.

The following contaminants were identified as COCs and are considered for remedial actions:

- Lead at concentrations exceeding the Industrial Direct Contact Criteria;
- Tetrachloroethene (PCE) at concentrations exceeding 20 times the Industrial Drinking Water Value; and
- Trimethylbenzenes at concentrations exceeding 20 times the Industrial Drinking Water Value.

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## 4.0 SELECTION OF REMEDIAL ALTERNATIVE

The FS considered several alternatives for remediation of Site 3. The remedial alternatives analyzed for Site 3 included:

- No Action: The no action alternative serves as a baseline for comparison with other remedial alternatives. Under this alternative, no remedial actions would be completed at Site 3 to contain or reduce the contamination in the soil and groundwater.
- Limited Action for Soil and Groundwater (Natural Attenuation, Monitoring, and Restrictions): Under the limited action alternative, the soil and groundwater contamination would not be contained or treated, but allowed to naturally attenuate. Institutional controls would be used to prevent human exposure to contaminated soils and to prevent the use of groundwater, as necessary. This alternative would include a fence around the bermed fire training area to prevent human contact with the lead contamination in excess of the Industrial Direct Contact Value. Monitoring the groundwater would allow an assessment of the natural attenuation to determine when the site no longer poses a threat to human health and the environment. Groundwater monitoring would be conducted on a quarterly basis, with three rounds of sampling per year. It is anticipated that the limited action would require long-term use of institutional controls due to the ineffectiveness of natural attenuation of the lead in soil.
- Clay Cap and In-situ Soil Treatment (Soil Vapor Extraction) and In-situ Groundwater Treatment (Air Sparging): This alternative would include a clay cap for the soil to prevent leaching of the soil contaminants and to prevent dermal contact with lead contamination. Volatile organic contaminants would be removed from the soil using soil vapor extraction (SVE). This alternative would also include treatment of the groundwater contaminants by air sparging. SVE and air sparging pilot tests would be conducted to provide necessary design information. This alternative would include institutional controls to prevent human exposure to lead contaminated soil and to prevent the use of

groundwater until the remedial actions are completed for this alternative. Quarterly groundwater monitoring, with three rounds per year, would be used to evaluate the remedial progress. A review would be completed as part of this alternative

- Soil Cap and Enhanced Volatilization for Soil and Aboveground Groundwater Treatment (Air Stripping): This alternative would involve the use of enhanced volatilization to remove volatile organic contaminants from the soil to prevent future leaching of the contaminants to the groundwater. Contaminated soils would be excavated for treatment by enhanced volatilization. Soils with metals in excess of the Calculated Background Values will be solidified with the addition of Portland cement. Once treated, the excavated soil will be used as backfill. Soils with lead contamination in excess of the Industrial Direct Contact Criteria would be placed at least 18 inches below the finished grade surface. The top 18 inches would be soils without contaminants in excess of the Industrial Direct Contact Value. This top 18 inches would act as a soil cap preventing human and small animal contact with soils in excess of the Industrial Direct Contact Values. This alternative would also include aboveground groundwater treatment of the groundwater contaminants by air stripping (for organic contaminants) and ion exchange (for inorganic contaminants). A pump test and a bench scale test would be completed to provide necessary design information. This alternative would include institutional controls to prevent human exposure to lead contamination and to prevent the use of groundwater until the remedial actions are completed for this alternative. Quarterly groundwater monitoring, with three rounds of sampling per year, would be used to evaluate the remedial progress. A review would be completed as part of the alternative.

The proposed/recommended remedial alternative for Site 3 consists of constructing a clay cap (the third alternative listed). The clay cap will provide dermal protection from the lead contamination and prevent leaching of soil contaminants to the groundwater. In addition, the alternative will include an in-situ treatment system (soil vapor extraction and air sparging) to address contaminated soil and groundwater. The SVE system will remove organic contaminants from the soil to prevent leaching to the groundwater. This will allow for effective groundwater

treatment without further leaching of contaminants to the groundwater. Air sparging, combined with SVE, will accelerate the removal of the organic contaminants from the groundwater. The alternative includes groundwater monitoring on a quarterly basis, with three sampling rounds per year. Maintenance will be required for the lifetime of the cap.

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## **5.0 CONCLUSION**

Based on the results of the field investigation, we have determined that Site 3 has both groundwater and soil contamination. Four contaminants are present in the groundwater in excess of the Industrial Drinking Water Values. Lead is present in the soil at the site in excess of Industrial Direct Contact. Two additional contaminants are present in the soil at concentrations exceeding 20 times the Industrial Drinking Water Values.

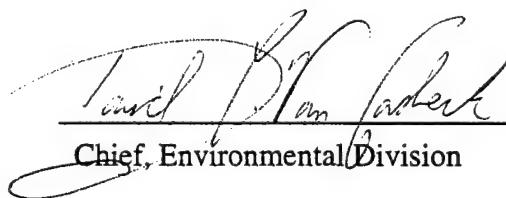
No source of the soil and groundwater contamination was identified during field investigation. The likely source is past operations at the site.

The proposed alternative for Site 3 includes the construction of a clay cap to prevent contact with, and to prevent leaching of soil contaminants to the groundwater. In addition, the alternative includes an in-situ treatment system (soil vapor extraction and air sparging) to address contaminated soil and groundwater. This alternative will effectively meet both ARARs and RAOs, including protection of human health and the environment.

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## 6.0 DECISION

On the basis of the findings at the MIANG Kellogg Site 3, there is evidence of environmental contamination at the site. The proposed remedial alternative for this site includes the installation of a clay cap and in-situ treatment of soil and groundwater. A final closure report will be prepared once the groundwater contamination levels have decreased to levels that meet the ARARs and RAOs established in the FS. Following the final closure report, this site will be removed from further consideration in the IRP process and no further investigative or remedial activities will be conducted with regard to the site.

  
David Blom, Jardot  
Chief, Environmental Division

19 Oct 97  
Date

Michigan Department of Environmental Quality

Concur

Non-Concur (Please provide reason)

---

Signature

---

Title

---

Date

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## 7.0 REFERENCES

U.S. Environmental Protection Agency, 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*.

The Earth Technology Corporation, 1995. *Internal Draft Remedial Investigation Report, 110th Fighter Group, Michigan Air National Guard, Battle Creek, Michigan*.

The Earth Technology Corporation, 1995. *Preliminary Assessment/Site Inspection Report, 110th Fighter Group Michigan Air National Guard, W. K. Kellogg Regional Airport, Battle Creek, Michigan*.

Engineering-Science, 1988. *IRP Draft Immediate Response Report, 110th TASG, Michigan ANG*.

Engineering-Science, 1992. *Final Site Investigation Report, 110th TASG, Michigan Air National Guard, W. K. Kellogg Regional Airport, Battle Creek, Michigan*.

Hazardous Materials Technical Center (Dynamic Corporation), 1987. *Installation Restoration Program Phase 1 Records Search: 110th TASG, Michigan Air National Guard, W. K. Kellogg Regional Airport, Battle Creek, Michigan*.

U. S. Environmental Protection Agency, 1979. *Water-Related Environmental Fate of 129 Priority Pollutants, Volume I, Introduction and Technical Background, Metals, and Inorganics, Pesticides and PCBs*.

Air Force Center for Environmental Excellence, 1995. *Bio-Venting Study for IRP Site 3 at the W.K. Kellogg Regional Airport, Battle Creek, Michigan*.

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## **APPENDIX A**

### **LETTER FROM THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY**

STATE OF MICHIGAN



JOHN ENGLER, Governor  
**DEPARTMENT OF ENVIRONMENTAL QUALITY**

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: [www.deq.state.mi.us](http://www.deq.state.mi.us)

RUSSELL J. HARDING, Director

REPLY TO:

ENVIRONMENTAL RESPONSE DIVISION  
KNAPPS CENTRE  
PO BOX 30426  
LANSING MI 48909-7926

September 4, 1997

Mr. Paul Wheeler  
ANGRC/CEVR  
3500 Futchet Avenue  
Andrews AFB, Maryland 20762-5157

SUBJECT: W.K. Kellogg Air National Guard Base, Calhoun County, Michigan

Dear Mr. Wheeler:

Staff of the Michigan Department of Environmental Quality (MDEQ), have reviewed the proposed remedies for Sites 1 and 3, and Area of Concern B, as presented in the "Further Action Decision Document for Site 1", Draft Final dated July 1996, and the "Further Action Decision Document for Site 3", Draft Final dated July 1996. MDEQ concludes that the proposed remedies will be an integral part of a Final Remedial Action Plan, yet to be submitted, for these sites pursuant to Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

Because contamination above applicable generic criteria will be left on the site, final remedial action will need to be either "Limited Industrial Closure," pursuant to Section 20120a(1)(f) to (j), or "Site Specific Closure" pursuant to Section 20120a(2). Section 20120b(3), (4) and (5) of Part 201 lists the legal requirements that must be addressed when a "Limited Industrial Closure" or "Site Specific Closure" applies. While we agree that your proposed remedies are consistent with a Final Remedial Action Plan, the following additional items will need to be addressed to bring these facilities to full lawful closure.

1. Access to media contaminated above generic criteria must be reliably restricted as described in Section 20120b(3)(a). Institutional controls on the property will need to take into account all relevant exposure pathways.
2. The extent of contamination both vertically and horizontally must be adequately defined as per Section 20114(1)(a). Limited additional sampling will be necessary to verify that source area soils and groundwater are adequately remediated and to assure that an adequate characterization of the extent of contamination, left on site, is obtained. Such additional well sampling locations, well screening depths, and sampling parameters, should be proposed in the forthcoming sampling plan and MDEQ should be notified when such additional sampling is scheduled.
3. A property description and survey that defines the areas addressed by the remedial action plan and contaminant boundaries need to be provided as per Section 20120b(4).
4. A long term operation, maintenance and monitoring plan for the site of contamination is necessary pursuant to Section 20120b(3)(b) and (c) to demonstrate that groundwater, in the source area as well as downgradient, does not exceed appropriate standards for a minimum period of one year prior to closure.

5. A Legally Enforceable Agreement between the State and the Air National Guard is necessary pursuant to Section 20120b(3).

With regard to the forthcoming sampling proposed for the W.K. Kellogg Air National Guard Base, the Data Quality Objectives and the level of Quality Assurance/Quality Control (QA/QC) must be thoroughly documented and consistent with the purpose of the investigation. As a minimum, Level III Data Quality as described in the USEPA publication, "Data Quality Objectives for Remedial Response Activities" 540/G-87/003, March 1987, must be used. It is also recommended that the constituents of concern be expanded to include all Method 8260 aromatics and solvents. The Quality Assurance Project Plan (QAPP) should include specific information concerning the analytical laboratory and procedures to be used. All laboratory procedures and documentation associated with site samples need to be included in or appended to the QAPP. These procedures include, but are not limited to, analytical methods, sample preparation procedures, initial calibration information, continuing calibration procedures, QC procedures, QC samples, QC limits, procedures for out-of-control situations, method performance, method detection limit determinations, and routine reporting limits.

In addition, we are concerned that there may have been considerable confusion regarding documents subject to review pursuant to Section 20114(8) of Part 201. This confusion occurs because of the cumbersome review and response to comment procedures which result in the submittal of "Draft" documents for comment, and "Draft/Final" documents for comment and "Final" documents for review.

To clarify our position, only documents declared a "Final" by you, and clearly identified in the transmittal letter as a "Final Remedial Action Plan" or "Final Interim Remedial Action Plan", will be reviewed in accordance with 20114(8). Submitted documents will not be subject to the provisions of Section 20114(8) until submitted as "Final". The Environmental Response Division will continue to review and comment on "draft" documents for technical merit, but we do not consider the draft "Interim Remedial Action Plans" currently in house to be subject to the provisions of Section 20114(8). For further clarification, we will not consider any "Draft" documents nor Final Interim Remedial Action Plans to be subject to the provisions of 20118, 20120b or 20120d. We anticipate that these draft interim submittals will be combined into area wide Final Remedial Action Plans and submitted to MDEQ at a later date for review pursuant to Section 20114(8).

We request that you provide this office with your concurrence of the above understanding.

If you have any questions please contact me at 517-241-7706.

Sincerely,

*George Jackson for*

Dan Schultz, Chief  
Field Operations Section  
Environmental Response Division

cc: Mr. Frederick Vollmerhausen, MANG  
Mr. Bob Delaney, DEQ  
W.K. Kellogg File - p:/bcm/wkkellog.doc